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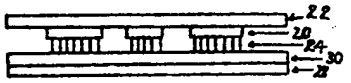
(54) Flock transfers.

(57) Flock transfers which utilize two transfer carriers and allow printing on to the finished surface of the flock. The method uses a release sheet (22) on which the design is flocked (24). The design is transferred to a transfer carrier (28) for application to a garment (38).



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FLOCK TRANSFERS

This invention relates to transfers. Transfers, including flock transfers, are distinguishable from other types of flocked products, since the desired design is not permanently affixed to an object until a relatively late stage; the flock is carried on a transfer sheet before application to, say, a garment. Methods of direct application or flocking are not relevant to the present invention.

Direct flocking is normally used for roll-to-roll goods, and on wallpaper, carpets and some garments. Flock transfers are normally used on garments where it is impractical to utilize direct flocking. Transfers differ from appliques in that a design which comprises more than one separate part can be transferred as one unit. Flock transfers are normally designs which are ironed on to garments by manufacturers and consumers. These transfers are normally used as substitutes in applications where embroidered designs are appropriate.

Flock transfers have achieved commercial significance in recent years, owing to their low cost and ease of application. Quality and handling expertise are now high.

There are several problems associated with commercially-available transfers of the type made in accordance with the method disclosed in US-A-4,292,100. This method, as can be illustrated with reference to Figure 1, requires four basic steps. Each step is critical, in order that a usable transfer should be obtained.

The first step is to coat a base paper sheet 2 with a low-tack adhesive 4. As the adhesive 4 dries, but is

still in a sticky state, the paper sheet 2 is electrostatically flocked with fibres 6. In commercial applications, the entire paper sheet 2 is usually flocked. Even if the entire sheet 2 is not flocked, the area of the paper which must be flocked has to be greater than just the design area.

The next step involves printing a pattern on the flock fibres 6. This pattern is the mirror image of the desired design. The ink must fully penetrate from the top face 8 of the fibres 6 to the point where they enter the adhesive 4, because the top face 8 becomes the bottom of the design when later applied to a garment.

This requirement, that the printing ink should travel the full length of the fibres 6, creates significant limitations in the known method. Firstly, high volumes of ink must be used. Secondly, fine lines are difficult to obtain, since the ink has a tendency to bleed as it travels the length of a fibre. Thirdly, the fibre length is limited, owing to the previously-mentioned inherent problems. Fourthly, the types of coatings are limited since many types of solids, e.g. metals such as silver, gold or aluminium, cannot be used. Fifthly, high binder volumes (which affect washability and durability) are not permitted, since a very hard finished product is obtained.

Printing an ink pattern over the flock is not always required. When such an ink pattern is printed, a binding adhesive 10 is placed over the ink pattern. If no ink pattern is printed, and the fibres themselves are to provide the desired design, then the binding adhesive 10 is applied in the pattern of the design. The purpose of this adhesive is to maintain the fibres 6 in a desired pattern when on the sheet 2. Since not all the fibres stand upright, it is difficult to control the printing of a layer of this adhesive.

The next step involves coating the binding adhesive 10 with a hot-melt powder 12. This powder is heat-cured, to bond it to the binding adhesive 10, and serves to bond the transfer to a garment.

The final step involves positioning the product of the previous step so that the face carrying the hot-melt adhesive 12 is in contact with a garment 4 which is to be decorated. It can be quite difficult to position the transfer, depending on the paper used, since it must be viewed through the paper sheet 2. After positioning, heat is applied to the paper, so that the hot-melt adhesive 12 is activated and penetrates the garment 14, to obtain a bond.

Once the hot-melt adhesive 12 has bonded the binding adhesive 10 and the fibres 6 to the garment 14, the paper sheet 2 is stripped off of the garment 14. The paper takes with it the low-tack adhesive 4 and the excess flock, and leaves the flock design on the garment. The paper has no value and thus the excess flock is wasted.

According to the present invention transfers are made by printing a first adhesive in a pattern on a release surface; applying particles on to the adhesive; applying on to the free faces of the particles a releasable adhesive which has been coated on to a transfer carrier; and removing the release surface from the first adhesive layer.

The present invention allows the printing of a desired pattern on to what is intended to be the finished surface of flock fibres. This contrasts with the methods of the prior art, which require the printing of a mirror image of the design, from the ends of the fibres distant from those which are intended to constitute the finished fibre surface. The method of the invention is relatively inexpensive, and allows for greater ease and accuracy in the use of transfers.

The present invention overcomes the given disadvantages of the known method of manufacturing flock transfers. In particular, the present invention is advantageous because it avoids the use of excess wasted flock. It is also advantageous since all printing is done on the top of the flock fibres as opposed to the bottom of the fibres. This allows the use of less ink and different types of materials such as metallics and fluorescents. It also allows the obtaining of sharper lines and high ink binder levels. A further advantage of the present invention is that the end user is able to align the transfer easily, before permanently affixing it to the garment. Another advantage is that the transfer can be produced utilizing either a hot melt or pressure-sensitive adhesive. Other advantages include the ability to use longer flock fibres, to use transfers in many direct flock applications, greater washability and durability, and to obtain more uniform binder adhesive since it is printed on a smooth surface rather than on the flocked fibres.

In the accompanying drawings, Figure 1 is a sequence of cross-sectional views illustrating a method of the prior art, as described above, and its products. The present invention will now be described by way of example only with respect to Figure 2, a sequence of cross-sectional views illustrating the product and the method of the present invention.

Figure 2 shows that the first step involves the printing of a binding adhesive 20 on to a non-tack primary release surface 22. This adhesive will serve as the binder for the particles or fibres. The adhesive 20 is a conventional acrylic emulsion (preferred), a urethane, vinyl acetate or other known resin. This adhesive should be water-proof, unaffected by dry-cleaning, and capable of forming a tenacious soft

film. The thickness of the adhesive 20 on the primary release surface 22 is preferably from 200 to 300 µm, and is printed in a desired pattern. Only the amount of adhesive to form the desired pattern is used.

The primary release surface or sheet 22 is coated with a non-stick release material. Such coatings include silicone and the material TEFLON (Registered Trade Mark). The primary release surface 22 can be any conventional support such as cloth, non-woven fabric, cellophane, synthetic resin film, sulphuric acid paper or kraft paper. Preferably, the primary release sheet 22 is paper and it is coated with silicone to provide it with a non-tack releasable character.

The primary release sheet 22 which has a binding adhesive 20 printed on its surface is flocked by electrostatic or vibration means. The fibres 24 in the electrostatic process are driven into the adhesive 20 substantially orthogonally thereto. In those areas where no adhesive 20 has been printed, no fibres stick to the primary release sheet 22. Following attachment of the fibres 24, the adhesive can be dried and the excess fibres are brushed and vacuumed off. The drying permanently binds the fibres in the desired decorative pattern.

The fibres which are used may be any of the numerous fibres normally utilised in transfers, such as rayon, nylon or polyester. In most cases the fibres are short fibres, 0.3 to 3 mm long. During the electrostatic process, an electrostatic charge passes through the fibres 24 and the primary release sheet 22. The fibres 24 which are charged are driven into the adhesive 20 on the primary release sheet 22. Almost any material can be used, including crushed leather, grass, metal, sand or paper. However, flock fibres are the preferred material.

It is not unusual to colour all or some of the fibres, in order to obtain a decorative design. The fibres 24 can be dyed, painted, sprayed, roll-coated, or coloured by sublimination transfer or other printing process. The level of binder in an ink emulsion can be greater than 8% w/w, a level which has previously been extremely difficult to achieve. Examples of printing methods which are suitable include screen printing and off-set printing.

In the present invention, the top surface 26 of the fibres 24, which will be the finished surface, is printed. Therefore, the fibres 24 do not have to be completely dyed from top to bottom, and so particles of materials including metals such as silver, gold and aluminium, can be used. Reflective, fluorescent and other types of materials can also be used in the process of the invention. Another benefit of not having to penetrate the full length of each fibre is that uniform colour is obtained with less ink. Sharp, clear lines can be maintained between colours.

A secondary transfer sheet 28 having a weak releasable adhesive 30 is separately prepared. The secondary transfer sheet 28 may be paper, non-woven fabric or polyester transparent plastics film. A transparent film is preferred, since it allows easier positioning of the transfer when it is applied to a garment. The adhesive 30 is usually a low-tack thermoplastic material. The preferred material is polyethylene. The amount should be at least just enough to hold the fibres, e.g. a layer 15 μm thick.

The flock fibres 24 are transferred on to the secondary transfer sheet 28 by placing the adhesive side 30 of the secondary transfer sheet 28 on to the free face 26 of the fibres 24. Pressure and heat are applied, which activates the thermoplastic adhesive. Owing to

the, say, silicone coating on the primary release sheet 22, the surface can be easily peeled away from the bonding adhesive 20, once adhesion has been established between the secondary transfer sheet 28 and the previously free face 26 of the fibres 24.

To the adhesive end 20 of the flocked fibres, a permanent adhesive 36 such as a hot-melt or pressure-sensitive adhesive is applied. This adhesive serves to fix the transfer to a garment. Hot-melt adhesives are preferred; suitable examples include polyamides, polyesters, ethylene vinyl acetate and mixtures thereof. These adhesives are in powder form, e.g. 30 to 350 μm in particle size, and are heat-cured after being spread over the binder adhesive.

Instead of using a binding adhesive and a hot-melt adhesive, a one-step adhesive can be used as the binding adhesive, which combines the properties of, say, acrylic and hot-melt adhesives. This can eliminate the powdering of the fibres with the hot-melt adhesive, at this point.

The transfer is now complete and can be stored or shipped to customers until needed. In use, the adhesive side 36 of the transfer is placed against a garment 38 in the location where the transfer design is desired. The transfer is heated, e.g. to 100 to 180 C while being pressed against the garment for, say, 2 to 60 seconds. During this process, the hot-melt adhesive 36 penetrates the material, providing a permanent bond with the garment. The secondary transfer sheet 28 and the releasable adhesive 30 can be peeled away, leaving a finished decorative flock design on the garment.

The transfer of the invention provides for significant flexibility and allows transfers to be created which were previously impossible. An example includes flocking a portion of a design on one primary release sheet and another portion of the design on a

second primary release sheet. The two design sections from the two sheets can be aligned and transferred to a single secondary transfer sheet, to form a unitary design. When the transfer is affixed to a garment, it transfers as a single complete design. This allows the use of differently colour fibres or different fibre lengths to be combined into one transfer. It also permits the use of different materials within one transfer.

Other examples of the flexibility and breadth of the invention include the use of applying the flocking to the base sheet by using binding adhesives which are activated at different temperatures, thus allowing the flocking of different portions of the design with different materials or colours by activating the adhesives separately. Further, mesh masks can be used to control the design achieved.

CLAIMS

1. A method of manufacturing a transfer, which comprises

a) printing a first adhesive in a pattern on a release surface;

b) applying particles to the first adhesive;

c) applying, on to the particles, a releasable adhesive which has been coated on to a transfer carrier; and

d) removing the primary release surface from the first adhesive.

2. A method according to claim 1, which additionally comprises printing a decorative, e.g. multi-colour, pattern on to the particles before the application of the releasable adhesive layer.

3. A method according to claim 2, wherein the printing comprises the application of metal or fluorescent particles, and/or the printing comprises screen-printing or off-set printing.

4. A method according to any preceding claim, wherein the particles are flock fibres, e.g. flocked by electrostatic means, e.g. 0.3 to 3 mm long, and which may be of different lengths and/or be differently coloured.

5. A method according to any preceding claim, which additionally comprises affixing the transfer to a garment, and removing the releasable adhesive layer and the transfer carrier.

6. A method according to any preceding claim, which comprises using a printing ink containing more than 8% w/v binder.

7. A method according to any preceding claim, wherein the transfer carrier is of a transparent plastics material.

8. A method according to any preceding claim, wherein the first adhesive comprises a binding adhesive, e.g. an acrylic emulsion, and a permanent adhesive.

9. A method according to claim 8, wherein the binding adhesive is in a tacky state while the particles are applied, and, preferably, the binding adhesive is dried after the particles have adhered to the binding adhesive.

10. A method according to claim 8 or claim 9, wherein the permanent adhesive is applied to the binding adhesive, e.g. after application of the transfer carrier to the particles; preferably, the permanent adhesive is heat-cured and/or comprises a hot-melt or pressure-sensitive adhesive.

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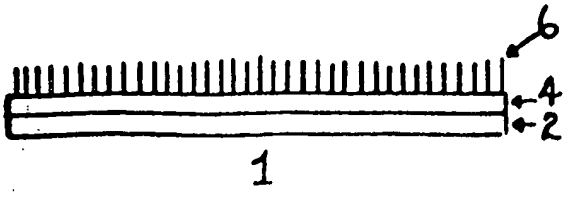

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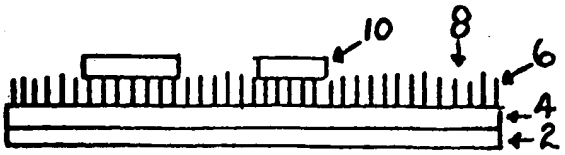

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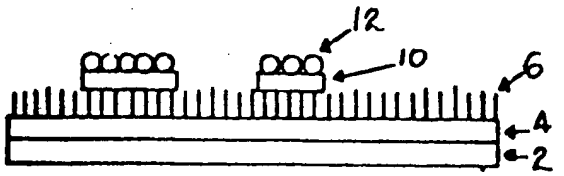

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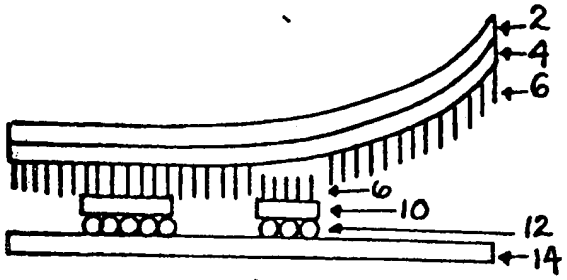

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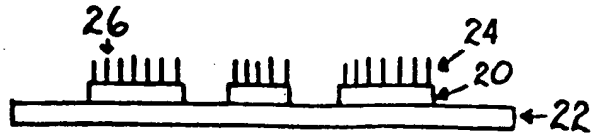
Fig. 1



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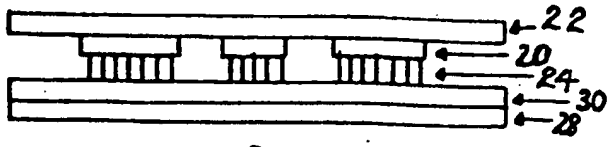

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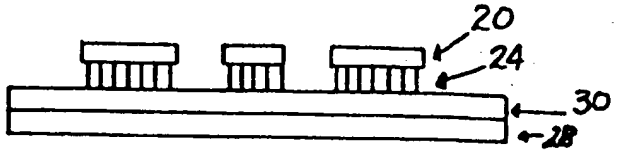

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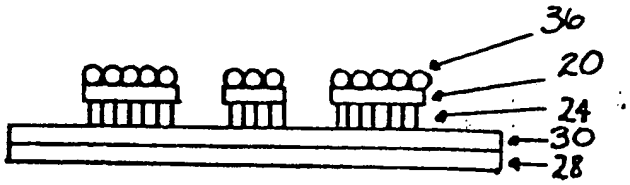

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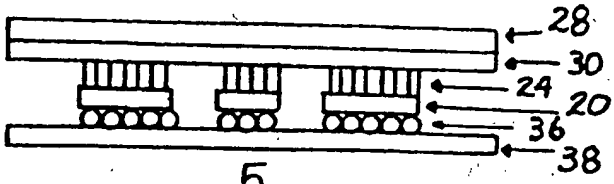

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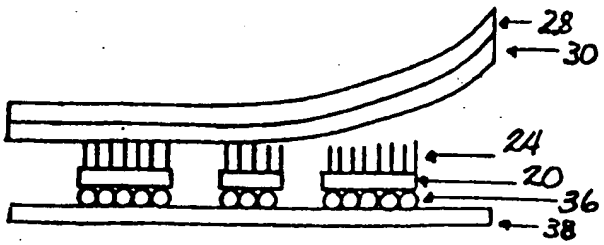

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Fig. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 85 30 3894

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl 4)
X	GB-A-2 065 031 (MAITLAND AND SONS LTD.) * Whole document *	1-10	D 06 Q 1/00 B 44 C 1/17 B 05 D 1/16 B 44 C 1/16
D,Y	US-A-4 292 100 (HIGASHIGUCHI) * Column 5, lines 39-54,64-65; figure 4 *	8-10	
A	* Column 5, lines 61-63 *	2-4,6	
X	FR-A-2 305 103 (SOCIETE IMPRESSION TROYENNES) * Whole document *	1-5	
Y		8-10	TECHNICAL FIELDS SEARCHED (Int Cl 4) B 44 C D 06 Q B 05 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13-02-1986	COUCKUYT D.E.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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